

PATENT

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Date: June 13, 2008

/Michelle Folger/
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant(s): David E. Heckerman, *et al.*

Examiner: Wilbert L. Starks

Serial No: 09/430,767

Art Unit: 2129

Filing Date: October 29, 1999

Title: CLUSTER-BASED AND RULE BASED APPROACH FOR AUTOMATED
WEB-BASED TARGETED ADVERTISING WITH QUOTAS

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellant's representative submits this brief in connection with an appeal of the above-identified patent application. If any additional fees are due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [MSFTP222USB].

I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the subject application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellant, appellant's legal representative, and/or the assignee of the subject application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1, 2, 4-36, 38 and 41-75 stand rejected by the Examiner. The rejection of claims 1, 2, 4-36, 38 and 41-75 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

Claim amendments were entered after the Final Office Action. The amendments were denied entry by the Examiner.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**A. Claim 1**

Independent claim 1 relates to a computer-implemented method. The method includes allocating each of a plurality of ads to at least one of a plurality of clusters based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster. (*See e.g.*, pg. 24, lns. 6-8; Figs. 2 and 3, elements 203, 205, 207, 213, 215, and 217; and Fig. 5.) The method also includes selecting an ad for a current cluster from ads allocated to the current cluster and effecting the ad. (*See e.g.*, pg. 11, lns. 18-20; pg. 25, lns. 3-7; and Fig. 5.)

B. Claim 36

Independent claim 36 relates to a computer-implemented method. The method includes defining a plurality of clusters. Each cluster corresponds to a group of users who are most receptive to a given type of ad. The method also includes defining the plurality of clusters comprises utilizing one of: user information obtained without monitoring; a Bayesian network; or a naïve-Bayes-network clustering approach. (See e.g., Figs. 2 and 3, elements 203, 205, 207, 213, 215, and 217; pg. 24, lns. 1-5; pg. 19, lns. 13-20; Fig. 4, and Fig. 5.) The method also includes allocating an ad having a particular type to at least one cluster based on the particular type of the ad and based on a predetermined criterion. (See e.g., pg. 24, lns. 6-8; and Fig. 5.)

C. Claim 46

Independent claim 46 relates to a computer-implemented method. The method includes determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i , and x_{ij} comprises a total number of times ad i is shown in cluster j . The method also includes outputting the allocation of each ad to at least one of the plurality of clusters. (See e.g., pg. 15, lns 13 to pg. 16, ln. 2, and Fig. 5.)

D. Claim 50

Independent claim 50 relates to a computerized system. The system includes a database (606) storing a plurality of ads, each ad having a quota. The system also includes an allocator (610) to allocate each of the plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least the quota for each ad and a constraint for each cluster. The system also includes a communicator (608) to select an ad for a current cluster from ads allocated to the current cluster and output the ad to a user. (See e.g., pg. 25, ln. 17 to pg. 26, ln. 19 and Fig. 6.)

E. Claim 53

Independent claim 53 relates to a machine-readable medium having instructions stored thereon for execution by a processor to perform a method. The method includes allocating each of a plurality of ads to at least one of a plurality of clusters based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster. (See e.g., pg. 24, lns. 6-8; Figs. 2 and 3, elements 203, 205, 207, 213, 215, and 217; and Fig. 5.) The method also includes selecting an ad for a current cluster from ads allocated to the current cluster and displaying the ad. (See e.g., pg. 11, lns. 18-20; pg. 25, lns. 3-7; and Fig. 5.)

F. Claim 59

Independent claim 59 relates to a machine-readable medium having instructions stored thereon for execution by a processor to perform a method. The method includes determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i , and x_{ij} comprises a total number of times ad i is shown in cluster j . The method also includes outputting the allocation of each ad to at least one of the plurality of clusters. (See e.g., pg. 15, lns 13 to pg. 16, ln. 2, and Fig. 5.)

G. Claim 62

Independent claim 62 relates to a computer-implemented method. The method includes applying each of at least one first ad to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first ad. The method also includes effecting the second ad for each of the at least one first ad. (See e.g., pg. 27, ln. 23 to pg. 28, ln. 14; and Fig. 7.)

H. Claim 69

Independent claim 69 relates to a computer-implemented method. The method includes determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activation of ads from training data and

determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ad. (*See e.g.*, pg. 29, lns. 18-20; and Fig. 8.) The method also includes generating a rule based on the ad and the at least one binary feature providing the largest activation, removing records from the training data matching the rule generated, and repeating to generate another, lower-ordered rule while at least one significant correlation still exists. (*See e.g.*, pg. 30, lns. 4-22; and Fig. 8.)

I. Claim 71

Independent claim 71 relates to a machine-readable medium having instructions stored thereon for execution by a processor to perform a method. The method includes applying each of at least one first ad to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first ad. (*See e.g.*, pg. 27, ln. 23 to pg. 28, ln. 14; and Fig. 7.) The method also includes effecting the second ad for each of the at least one first ad. (*See e.g.*, pg. 11, ln. 20; and Fig. 5.)

J. Claim 75

Independent claim 75 relates to a machine-readable medium having instructions stored thereon for execution by a processor to perform a method. The method includes determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of ad from training data and determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ad. (*See e.g.*, pg. 29, lns. 18-20; and Fig. 8.) The method further includes generating a rule based on the ad and the at least one binary feature providing the largest activation, removing records from the training data matching the rule generated, and repeating to generate another, lower-ordered rule while at least one significant correlation still exists. (*See e.g.*, pg. 30, lns. 4-22; and Fig. 8.)

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

- A.** Whether claims 1, 2, 4-36, 38, and 41-76 are unpatentable under 35 U.S.C.

§101 as being directed to non-statutory subject matter.

B. Whether claims 1, 2, 4-36, 38, and 41-76 are unpatentable under 35 U.S.C. §112, first paragraph because current case law and the MPEP require such a rejection if a §101 rejection is given).

C. Whether claims 1 and 2 are unpatentable under 35 U.S.C. §102(e) as being anticipated by Ballard (U.S. 6,182,050).

VII. Argument (37 C.F.R. §41.37(e)(1)(vii))

A. Rejection of Claims 1, 2, 4-36, 38, and 41-76 Under 35 U.S.C. §101

Claims 1, 2, 4-36, 38, and 41-76 stand rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. This rejection is improper because the subject claims recite statutory subject matter as defined by 35 U.S.C. § 101 and, further, the subject claims relate to practical applications that as a whole produce useful, concrete and tangible results.

Patentable subject matter is defined by 35 U.S.C. §101, which reads as follows:

[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Summarizing the Supreme Court decisions interpreting 35 U.S.C. §101, the Federal Circuit has stated:

The Supreme Court has construed §101 broadly, noting that Congress intended statutory subject matter to "include anything under the sun that is made by man." *See Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952)); *see also Diamond v. Diehr*, 450 U.S. 175, 182 (1981). Despite this seemingly limitless expanse, the Court

has specifically identified three categories of unpatentable subject matter: "laws of nature, natural phenomena, and abstract ideas." *See Diehr*, 450 U.S. at 185.

(*AT&T*, 172 F.3d at 355).

To determine whether subject matter is patentable, the Federal Circuit has adopted the test articulated in its *en banc* decision *In re Alappat*, 33 F.3d 1526, 31 U.S.P.Q.2d 1545 (Fed. Cir. 1994) (*en banc*) – whether the claimed subject matter as a **whole** achieves a **useful, concrete and tangible result**. (*See In re Alappat* 33 F.3d at 1544, 31 U.S.P.Q.2d at 1557; *see also State Street*, 149 F.3d at 1373, 47 U.S.P.Q.2d at 1601; and *AT&T*, 172 F.3d at 1359-61, 50 U.S.P.Q.2d at 1453-54). The *Alappat* test is founded in the Supreme Court's ruling in *Diehr*. (*See In re Alappat*, 33 F.3d at 1543-45, 31 U.S.P.Q.2d at 1556-58; *see also State Street*, 149 F.3d at 1373-74, 47 U.S.P.Q.2d at 1600-02; and *AT&T*, 172 F.3d at 1356-58, 50 U.S.P.Q.2d at 1450-52). Regarding inventions that include mathematical algorithms, the Federal Circuit has characterized the *Alappat* inquiry as:

simply requir[ing] an examination of the contested claims to see if the claimed subject matter **as a whole** is a disembodied mathematical concept representing nothing more than a "law of nature" or an "abstract idea," or if the mathematical concept has been reduced to some practical application rendering it "**useful**."

(*AT&T*, 172 F.3d at 1357, 50 U.S.P.Q.2d at 1451) (emphasis added). Thus, after the Supreme Court's rulings in *Diehr* and the Federal Circuit's rulings in *Alappat*, *State Street*, and *AT&T*, the proper test to be applied to determine patentable subject matter is whether the subject matter as a **whole** produces a **useful, concrete and tangible result**. (*See In re Alappat*, 33 F.3d at 1543-45, 31 U.S.P.Q.2d at 1556-58; *see also State Street*, 149 F.3d at 1373-74, 47 U.S.P.Q.2d at 1600-02; and *AT&T*, 172 F.3d at 1357-38, 50 U.S.P.Q.2d at 1450-52).

It is respectfully submitted that the subject claims go beyond manipulation of merely abstract ideas and produce useful, concrete and tangible results.

The subject application relates to cluster-based and rule based approaches for targeted advertising with quotas. Ads, such as banner ads, house ads, and targeted advertising are used to advertise or bring awareness of items, services, events and so on to the consuming public. (*See e.g.*, pg. 1, lns. 11-15; pg. 2, lns. 4-6; pg. 11, lns. 5-14; and pg. 17, lns. 5-9).

Claims 1, 2, and 4-35:

Independent claim 1, from which claims 2 and 4-35 depend, recites *a computer-implemented method comprising allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster, selecting an ad for a current cluster from ads allocated to the current cluster; and effecting the ad.*

Effecting the ad includes displaying the ad or displaying a button on a web site for immediate purchase of an item. (*See e.g.*, pg. 11, ln. 18 to pg. 12, ln. 3 and page 28. lns. 10-14). Even if “ads”, assuming *arguendo*, are abstract ideas, the subject claims go beyond mere manipulation of abstract items and a person of ordinary skill in the relevant art would appreciate the usefulness and practical application of the subject claims. Specific and substantial utilities of the subject claims relate to maximizing a click through rate for ads given a quota, allowing web site operators to maximize earning potential from advertising, adhering to various obligations relating to advertising within certain clusters (*e.g.*, adult-oriented ad might not be desired to be shown in a children-oriented cluster), as well as other utilities. (*See e.g.*, pg. 3, ln. 13 to pg. 4, ln. 4). In addition, some advertisers can be favored over other advertisers for various reasons. (*See e.g.*, pg. 16, lns. 18-20).

Effecting the ad can also relate to maximizing a possibility that a user (*e.g.*, consumer) will purchase something, “not just click on the ad.” (*See e.g.*, pg. 18, lns. 16-17). In one example, advertisers pay to have their ads served in such a manner that the ads are likely to be “clicked on” or actuated. (*See e.g.*, pg. 1, lns. 19-21.) Thus, effecting the ad can increase an actuation occurrence of the effected ad, which is useful, concrete, and tangible because such increased actuation can increase revenue generated from web advertising as one example of a practical application. (*See e.g.*, pg. 1 lns. 22-24.)

Based on at least the above, claim 1 (and the claims that depend there from) relates to practical applications and produce a useful, tangible and concrete result for both an advertiser and a web site operator in order to maximize earning potentials from advertising. (See e.g., pg. 3, lns. 17-19.) Therefore, the subject claims are directed to statutory subject matter and this rejection should be withdrawn.

Claims 36, 38 and 41-45:

Independent claim 36 (from which claims 38 and 41-15 depend) *a computer-implemented method comprising **defining a plurality of clusters, each cluster corresponding to a group of users who are most receptive to a given type of ad, ... allocating an ad** having a particular type to at least one cluster based on the particular type of the ad and **based on a predetermined criterion.*** The subject matter of claim 36 relates to allocating ads by defining clusters that each correspond to a group of users most receptive to a given type of ad. A practical application that is useful, concrete and tangible is to allocate the ads to the cluster so that the ads are allocated to the group of users most receptive to the given type of ad. In an example, if the ads are allocated to the group of users most receptive to the ad, it can maximize the number of click throughs of an ad and can maximize earning potential from advertising, which is a concrete, tangible, and useful result. (See e.g., pg. 3, lns. 17-19.)

Thus, based on at least the foregoing, the method recited in claim 36 (and accordingly claims 38 and 41-45), as a whole, produces a concrete, tangible and useful result and is directed toward statutory subject matter. Accordingly, this rejection should be withdrawn.

Claims 46-49:

Independent claim 46, from which claims 47-49 depend, recites *a computer-implemented method comprising **determining an allocation for each of a plurality of ads to at least one of a plurality of cluster, given a constraint ... that comprises a quota for an ad .. and a total number of times ad is shown in the cluster... and **outputting the allocation of each ad to at least one of the plurality of clusters.***** A quota for an ad and a total number of times an ad is shown in a cluster can determine how each ad is output,

which can meet advertising requirements, since each ad is selected based on the quota. Thus, the claim recites at least one real-world concrete, tangible, and useable result.

Accordingly, claims 46-49 produce a useful, concrete, and tangible result and are directed toward statutory subject matter and this rejection should be withdrawn.

Claims 50-52:

Independent claim 50, from which claims 51 and 52 depend, recites *a computerized system comprising a database storing a plurality of ads, each ad having a quota, an allocator to allocate each of the plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least the quota for each ad and a constraint for each cluster; and a communicator to select an ad for a current cluster from ads allocated to the current cluster and output the ad to a user.* The subject matter of claim 50 recites a system that includes a database, an allocator, and a communicator, which clearly falls within at least one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101. Further, the claim relates to selecting an ad from a plurality of ads allocated based, in part, on a quota and outputting the ad to a user. A practical application of the claim relates to displaying ads to users in clusters, thus meeting the quota. (See e.g., pg. 18, lns. 16-17.)

Based on at least the above, independent claim 50 and dependent claims 51 and 52 produce a useful, concrete, and tangible result and relate to patentable subject matter. Therefore, this rejection should be withdrawn.

Claims 53-58:

Independent claim 53, from which claims 54-58 depend, recites *a machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster, selecting an ad for a current cluster from ads allocated to the current cluster, and displaying the ad.*

Independent claim 53 recites structure in a machine-readable medium having instructions stored thereon for execution by a processor to perform a method, which

clearly falls within at least one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101. Further, claim 53 recites *allocating* each of a plurality of ads based, in part, on at least a quota for each ad and *selecting* an ad and *displaying the ad*. In an example of a practical application, the quota for each ad can be dictated by advertising contracts that must be fulfilled. (See e.g., pg. 2, lns. 9-12.) The quota can also be that an ad should not be displayed in a current cluster, such as if the current cluster is a child oriented cluster and the ad relates to adult content. (See e.g., pg. 3, ln. 20 to pg. 4, ln. 4; and pg. 17, ln. 20-23.) Thus, the selection and display of ads to meet a quota is a concrete, tangible, and useful result.

Based on at least the above, it is requested that the rejection of claims 53-58 be withdrawn.

Claims 59-61:

Independent claim 59, from which claims 60 and 61 depend, recites, *a machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising **determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint ...and outputting the allocation of each ad to at least one of the plurality of clusters.*** The machine-readable medium having instructions stored thereon for execution by a processor recited in the independent claim clearly falls within at least one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101. Further claim 59, relates to allocating a plurality of ads and outputting the allocation of each ad to one or more of the plurality of clusters. In one example, the claim as a whole reduces to a practical application by providing a preference to an ad so that greater revenue can be obtained based on a per-displayed ad or a per-clicked through ad basis from an advertiser of the preferred ad. (See e.g., pg. 16, lns. 18-20.)

Thus, claim 59 (and claims 60 and 61), as a whole, produces a concrete, tangible, and useful result. This rejection should be withdrawn because the claims are directed toward statutory subject matter.

Claims 62-68:

Independent claim 62, from which claims 63-68 depend, recites *a computer-implemented method comprising applying each of at least one first ad to an ordered set of rules, each rule accounting for a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first ad, and effecting the second ad for each of the at least one first ad*. In an example, a quota can be a click-through rate quota for each of the plurality of ads, which can maximize earning potential from advertising. This is clearly a concrete, tangible, and useful result. (See *e.g.*, pg. 3, Ins. 17-19.)

In view of at least the foregoing, it is readily apparent that the subject claims are directed toward statutory subject matter and go beyond abstract ideas to produce a concrete, tangible, and useful result. Thus, this rejection should be withdrawn.

Claims 69 and 70:

Independent claim 69, from which claim 70 depends, recites *a computer-implemented method comprising determining at least one significant correlation between a plurality of binary features of training data and a plurality of activation of ads from the training data, determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ad, generating a rule based on the ad and the at least one binary feature providing the largest activation and removing records from the training data matching the rule generated and repeating to generate another, lower-ordered rule while at least one significant correlation still exists*. The binary features can be expressed as either “yes” or “no”, “true” or “false” and so forth. (See *e.g.*, pg. 28, Ins. 20-24.) The activation of items can be click-through rates, for example. (See *e.g.*, pg. 29, 18-19.) The claimed method generates, based on training data, an ordered set of rules. Thus, the claim produces a concrete, usable, and tangible result by applying the ordered set of rules to the ads.

Based on at least the above, claim 69, as a whole, reduces to practical application a concrete, useful and tangible result. Thus, it is requested that this rejection be withdrawn.

Claims 71-74:

Independent claim 71, from which claims 72-74 depend, recites *a machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising applying each of at least one first ad to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first as and effecting the second ad for each of the at least one first ad*. The subject matter of claim 71 recites a machine-readable medium having instructions stored thereon for execution by a processor to perform a method, which clearly falls within at least one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101. Further, the subject matter of claim 71, applies rules for ads to be managed, which is more than manipulate of abstract ideas as, as a whole, produces a concrete, usable, and tangible result.

Therefore, it is submitted that the rejection of claims 71-74 should be withdrawn.

Claim 75:

Independent claim 75 recites, *a machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising determining at least one significant correlation between a plurality of binary features of training data and a plurality of activations of ad from training data, determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ad, generating a rule based on the ad and the at least one binary feature providing the largest activation, removing records from the training data matching the rule generated, and repeating to generate another, lower-ordered rule while at least one significant correlation still exists*.

Claim 75 recites a machine-readable medium having instructions stored thereon for execution by a processor to perform a method, which clearly falls within at least one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101. Further, the subject matter of claim 75, applies rules for ads to be managed, which is a concrete, usable, and tangible result.

Based on at least the above it is requested that the rejection of claims 75 be withdrawn.

B. Rejection of Claims 1, 2, 4-36, 38, and 41-76 Under 35 U.S.C. §112

Claims 1, 2, 4-36, 38, and 41-76 stand rejected under 35 U.S.C. §112, first paragraph because current case law and the MPEP require such a rejection if a §101 rejection is given. This rejection should be withdrawn for at least the following reasons because, as discussed above, the subject claims disclose a practical application that produces a concrete, tangible and useful result and go beyond manipulation of abstract ideas. As such, the subject claims recite statutory subject matter as defined by 35 U.S.C. § 101. Therefore, this rejection should be withdrawn.

C. Rejection of Claims 1 and 2 Under 35 U.S.C. §102(e)

Claims 1 and 2 stand rejected under 35 U.S.C. §102(e) as being anticipated by Ballard (U.S. 6,182,050). This rejection should be withdrawn for at least the following reason. Ballard does not anticipate the limitations recited in the subject claims.

For a prior art reference to anticipate, 35 U.S.C. §102 requires that “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950 (Fed. Cir. 1999) (*quoting Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

“To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.’” *Id.* (*quoting Continental Can co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Mehl/Biophile Int’l Corp. v. Milgraum*, 192 F.3d 1362, 1365, 52 USPQ2d 1303, 1305 (Fed. Cir. 1999), *reh’g denied*, 1999 U.S. App. LEXIS 31386 (Fed. Cir. Oct. 27, 1999) (*quoting In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981)).

Independent claim 1, recites *a computer-implemented method comprising allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster, selecting an ad for a current cluster from ads allocated to the current cluster and effecting the ad.* For example, the quota for each ad and the constraint for each cluster can be used to maximize a number of click through for all the ads, given the quotas and constraints. (See e.g., pg. 15, lns. 8-11). Ballard does not expressly nor inherently describe such novel features.

Instead, Ballard relates to advertisement distribution *based on demographic data.* (See e.g., col. 9, lns. 39-48). These demographics are characteristics of human populations and population segments and can include hobbies, interest, credit history, travel history and past purchasing history. (See e.g., col. 1, lns. 21-33 and col. 7, lns. 3-13). However, Ballard fails to teach or even suggest accounting for at least a quota for each ad and a constraint for each cluster, as claimed.

Since Ballard does not expressly or inherently describe all limitations recited in the subject claims this rejection should be withdrawn and the subject claims allowed.

D. Conclusion

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1, 2, 4-36, 38 and 41-75 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063[MSFTP222USB].

Respectfully submitted,
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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A computer-implemented method comprising:
 allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster;
 selecting an ad for a current cluster from ads allocated to the current cluster; and,
 effecting the ad.
2. The method of claim 1, effecting the ad comprises displaying the ad.
3. (Cancelled).
4. The method of claim 2, the predetermined criterion further accounts for a particular one of the plurality of ads restricted from being shown in a particular one or more of the plurality of clusters.
5. The method of claim 2, the predetermined criterion comprises maximizing an expression $\sum_j p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i .
6. The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i , and x_{ij} comprises a total number of times ad i is shown in cluster j .
7. The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j .

8. The method of claim 5, the predetermined criterion comprises maximizing the expression subject to a first constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i , and x_{ij} comprises a total number of times ad i is shown in cluster j , and a second constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j , such that the expression, the first constraint and the second constraint define a linear program.
9. The method of claim 8, the linear program is solved by the Simplex Algorithm.
10. The method of claim 2, allocating each of a plurality of ads to at least one of the plurality of clusters comprises determining for each ad in each cluster a probability that a user in the cluster will actuate the ad.
11. The method of claim 10, the probability that a user in the cluster will actuate the ad comprises the probability that a user in the cluster will click on the ad.
12. The method of claim 10, determining for each ad in each cluster a probability that a user in the cluster will actuate the ad comprises inputting training data from which to determine for each ad in each cluster the probability that a user in the cluster will actuate the ad.
13. The method of claim 10, determining for each ad in each cluster a probability that a user in the cluster will actuate the ad comprises utilizing at least one of: a maximum likelihood approach, a MAP method approach, and, a hierarchical Bayesian approach.
14. The method of claim 2, the predetermined criterion comprises maximizing an expected number of actuations of the plurality of ads, given the quota for each ad and the constraint for each cluster.

15. The method of claim 2, the constraint for each cluster comprises a total number of times the cluster is visited by any user.
16. The method of claim 2, the quota for each ad comprises a total number of times that the ad must be displayed.
17. The method of claim 2, the criterion comprises favoring at least one ad over other ads within the plurality of ads in allocating the at least one ad.
18. The method of claim 2, the criterion comprises accounting for at least one house ad.
19. The method of claim 2, the predetermined criterion comprises minimizing an expression $\sum_j p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i .
20. The method of claim 2, the predetermined criterion comprises maximizing an expression $\sum_j \alpha_i p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i , and α_i comprises a coefficient for the ad i to indicate weighting of the ad i .
21. The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $x_{ij} = 0$ for a particular ad i within a particular cluster j , where x_{ij} comprises a total number of times the ad i is shown in the cluster j .
22. The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_i x_{ij} \leq c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j .

23. The method of claim 10, the probability that a user in the cluster will actuate the ad comprises the probability that a user in the cluster will make a purchase based on the ad.
24. The method of claim 2, the method includes first initially defining the plurality of clusters.
25. The method of claim 24, defining the plurality of clusters comprises utilizing user information obtained without monitoring.
26. The method of claim 24, utilizing user information obtained without monitoring comprises utilizing a category tag (e.g., page group) of the page on which the ad is to be displayed.
27. The method of claim 25, utilizing user information obtained without monitoring comprises utilizing user information obtained from the user via a questionnaire.
28. The method of claim 24, defining the plurality of clusters comprises utilizing a preexisting plurality of groups as the plurality of clusters.
29. The method of claim 24, defining the plurality of clusters comprises utilizing a Bayesian network.
30. The method of claim 24, defining the plurality of clusters comprises utilizing a naïve-Bayes-network clustering approach.
31. The method of claim 30, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture.
32. The method of claim 30, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture recursively to construct a hierarchy of

clusters.

33. The method of claim 30, utilizing a Bayesian network clustering approach comprises training a Bayesian network using a stochastic gradient descent technique.

34. The method of claim 30, utilizing a Bayesian network clustering approach comprises employing a single hidden variable having a plurality of values.

35. The method of claim 30, utilizing a Bayesian network clustering approach comprises employing a plurality of hidden variables, each having two values.

36. A computer-implemented method comprising:

defining a plurality of clusters, each cluster corresponding to a group of users who are most receptive to a given type of ad, defining the plurality of clusters comprises utilizing one of:

user information obtained without monitoring;

a Bayesian network; or

a naïve-Bayes-network clustering approach; and,

allocating an ad having a particular type to at least one cluster based on the particular type of the ad and based on a predetermined criterion.

37. (Cancelled).

38. The method of claim 36, utilizing user information obtained without monitoring comprises utilizing user information obtained from the user via a questionnaire.

39. (Cancelled).

40. (Cancelled).

41. The method of claim 36, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture.
42. The method of claim 36, utilizing a Bayesian network clustering approach comprises utilizing a hierarchical bottleneck architecture.
43. The method of claim 36, utilizing a Bayesian network clustering approach comprises training a Bayesian network using a stochastic gradient descent technique.
44. The method of claim 36, utilizing a Bayesian network clustering approach comprises employing a single hidden variable having a plurality of values.
45. The method of claim 36, utilizing a Bayesian network clustering approach comprises employing a plurality of hidden variables, each having two values.
46. A computer-implemented method comprising:
 - determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i , and x_{ij} comprises a total number of times ad i is shown in cluster j ; and,
 - outputting the allocation of each ad to at least one of the plurality of clusters.
47. The method of claim 46, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises maximizing an expression $\sum_{ij} p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i , given the constraint.
48. The method of claim 46, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises determining the allocation for each of the plurality of ads to at least one of the plurality of clusters further given a constraint

$\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j .

49. The method of claim 46, further comprising:
selecting an ad for a current cluster from the allocation of each ad to the current cluster; and,
displaying the ad.
50. A computerized system comprising:
a database storing a plurality of ads, each ad having a quota;
an allocator to allocate each of the plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least the quota for each ad and a constraint for each cluster; and,
a communicator to select an ad for a current cluster from ads allocated to the current cluster and output the ad to a user.
51. The system of claim 50, at least one of the allocator and the communicator comprises a computer program executed from a computer-readable medium by a processor.
52. The system of claim 50, the database is stored as data on a computer-readable medium.
53. A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:
allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster;
selecting an ad for a current cluster from ads allocated to the current cluster; and,
displaying the ad.

54. The medium of claim 53, the predetermined criterion comprises maximizing an expression $\sum_j p_j x_j$, where p_j comprises a probability that a user in cluster j will actuate ad I

55. The medium of claim 54, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_j x_j = q_i$, where q_i comprises a quota for ad i , and x_j comprises a total number of times ad i is shown in cluster j .

56. The medium of claim 54, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j .

57. (The medium of claim 53, allocating each of a plurality of ads to at least one of the plurality of clusters comprises determining for each ad in each cluster a probability that a user in the cluster will actuate the ad.

58. The medium of claim 53, the predetermined criterion comprises maximizing an expected number of actuations of the plurality of ads, given the quota for each ad and the constraint for each cluster.

59. A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_j = q_i$, where q_i comprises a quota for ad i , and x_j

comprises a total number of times ad i is shown in cluster j ; and,

outputting the allocation of each ad to at least one of the plurality of clusters.

60. The medium of claim 59, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises maximizing an expression $\sum_{ij} p_{ij} x_{ij}$,

where p_{ij} comprises a probability that a user in cluster j will actuate ad i , given the constraint.

61. The medium of claim 59, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises determining the allocation for each of the plurality of ads to at least one of the plurality of clusters further given a constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j , and x_{ij} comprises a total number of times ad i is shown in cluster j .

62. A computer-implemented method comprising:

applying each of at least one first ad to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first ad; and,

effecting the second ad for each of the at least one first ad.

63. The method of claim 62, each first ad comprises at least information about a user, and a web page currently being browsed by the user.

64. The method of claim 62, effecting the second ad comprises displaying the ad.

65. The method of claim 62, further comprising generating the ordered set of rules based on training data.

66. The method of claim 65, generating the ordered set of rules comprises:
determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of second ads of the training data;
determining a second ad and at least one binary feature providing a largest activation; and,
generating a rule based on the second ad and the at least one binary feature providing the largest activation.
67. The method of claim 66, generating the ordered set of rules further comprises:
removing records from the training data matching the rule generated; and,
repeating to generate another, lower-ordered rule while at least one significant correlation still exists.
68. The method of claim 66, determining at least one significant correlation comprises utilizing one of: Chi-squared method, Fisher exact test method, and Bayesian model selection method.
69. A computer-implemented method comprising:
determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activation of ads from training data;
determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ad;
generating a rule based on the ad and the at least one binary feature providing the largest activation;
removing records from the training data matching the rule generated; and,
repeating to generate another, lower-ordered rule while at least one significant correlation still exists.
70. The method of claim 69, each ad comprises an ad.

71. A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

- applying each of at least one first ad to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ads, to determine a second ad for each of the at least one first ad; and,
- effecting the second ad for each of the at least one first ad.

72. The medium of claim 71, the method further-comprising generating the ordered set of rules based on training data.

73. The medium of claim 71, each first ~~mad~~ ad comprises at least information about a user, and a web page currently being browsed by the user, and each second ad comprises an ad.

74. The medium of claim 71, generating the ordered set of rules comprises:

- determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of second ad of the training data;
- determining a second ad and at least one binary feature providing a largest activation;
- generating a rule based on the second ad and the at least one binary feature providing the largest activation;
- removing records from the training data matching the rule generated; and,
- repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

75. A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

- determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of ad from training data;
- determining an ad and at least one binary feature providing a largest activation,

each rule accounting for at least a quota for the ad;

generating a rule based on the ad and the at least one binary feature providing the largest activation;

removing records from the training data matching the rule generated; and,

repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

76. (Cancelled)

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.